Central Asia's Hydrometeorological Services

An Overview of USAID Activities in Central Asia

Development Challenge

The importance of agriculture and hydropower to Central Asia cannot be overstated. Better water management is essential to the economic security and political stability of this region, which depends heavily on irrigated agriculture. The agricultural sector is the main employer, with up to 60% of the labor force. Agricultural production contributes 20-25% of the region's GNP, which is down from 50% of GNP during the Soviet era.

The hydrometeorological (hydromet) services of the five Central Asian countries are government agencies responsible for collecting, analyzing and distributing the weather, stream flow and water quality data necessary to effectively manage water resources. The hydromet services provide weather and stream flow forecasts for crop planting, irrigation scheduling and harvesting in the agricultural sector. Stream flow forecasts are also used to allocate water resources for hydropower and irrigation and to help develop annual international water allocation agreements.

Improvements in the accuracy of the hydromet services' short-term and long-term water and weather forecasts can lead to improvements in determining when to plant, when to irrigate, and when to harvest crops in this arid region. Sources cited by the World Meteorological Organization indicate that timely and accurate forecasts translate directly into economic benefits as a result of improved crop protection, crop harvesting, irrigation scheduling, crop choice, road maintenance, and electric power generation. Although data is currently not available for Central Asia, one study has demonstrated that an internal rate of return of up to 26% is possible from improved hydrometeorological forecasts for agriculture.

USAID's Response

USAID collaborates closely with other international partners and the individual national hydromet service in each of the five Central Asian countries. In the Soviet era, the hydromet services operated as one agency. However, after independence, they became individual national-level organizations lacking the regional cooperation that is currently being re-established by USAID. Though USAID's interventions principally consist of key technical support, they also serve a practical function in that they build the capacity of the region's separate hydromet services and help them use this new capacity to come together and openly share data and information in a regional network. USAID's program is helping the hydromet services work together, thus contributing to regional stability and security, which is a major U.S. foreign policy goal in Central Asia.

After the collapse of the Soviet Union, existing meteorological ground stations no longer functioned effectively due to lack of funds, decreasing staff and antiquated equipment. USAID installed automated meteorological stations to improve the on-the-ground network for weather and snowmelt data collection in the five Central Asian countries. The stations, some of which are located in remote mountain and desert locations, automatically collect and transmit weather data. Because the hydromet service staff have been using outdated equipment (including Morse code to transmit information and pen and paper to do calculations) and have little or no experience with modern tools, USAID is providing extensive training on installation, operation and maintenance of the automated equipment to technical specialists at each national hydromet.

USAID also helped modernize and upgrade the central communication centers for the Kyrgyz, Kazakh, and Uzbek hydromet services so they can more readily gather and analyze information from data collection stations in their national system. Modern equipment provides them the potential to now share data in a more timely manner. With new equipment, weather and water information from the on-the-ground data collection stations is transferred to the central communication centers for data processing, analysis and distribution to users. USAID is also improving the transfer of operational information from the hydrometeorological network to data processing centers. To further improve data sharing, processing and storage capabilities, USAID funded the installation of a local area network (LAN) and computer hardware at each hydromet service. Significant improvements in forecasting and data communications capabilities throughout the region have resulted.

Training is a key feature of USAID's program. USAID's training programs supported initial implementation of a stream flow forecasting system for seven sub-basins located in Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan. Under USAID's guidance and technical assistance, a Snowmelt Steering Committee was organized to discuss issues related to stream flow forecasting at the highest technical levels. This group now receives support from other international donors. Several regional training programs were also sponsored to present state-of-the-art methods for preparing reliable operational and seasonal snowmelt runoff forecasts. These training programs both improved the forecasting skills of hydrometeorological specialists and stimulated the exchange of ideas and data among Central Asian forecasting specialists.

Benefits

The Kyrgyz hydromet service has reported a two-fold reduction in the time required for receiving accurate meteorological data, as a direct result of USAID assistance. Other benefits include: 1) the ability to extend accurate weather forecasting from three to up to five days, 2) a 5-10% increase in the accuracy of weather forecasts, and 3) a 50% reduction in the time required for preparing various agricultural, weather and hydrological bulletins. The ability to make longer-range weather forecasts due to equipment supplied by USAID to the Kyrgyz Hydromet allowed prediction of a cold weather snap in September 2002 that gave farmers sufficient warning to begin an early harvest of the potato crop, preventing a potentially devastating economic loss. In another case, the use of the National Weather Service River Forecast System provided by USAID to the Uzbek Hydromet allowed a short-term prediction of reservoir inflow to a major reservoir during the abnormally rainy spring of 2002 and helped to reduce the potential threat of excessive reservoir overflow or dam failure. Failure to accurately forecast annual water runoff can have potentially devastating impact. For example, during the year 2000 growing season, prior to the installation of improved systems, actual water availability for irrigation purposes was only 40% of what was predicted, resulting in significant losses in rice, cotton, and other crop production in drought affected areas in Uzbekistan, along the lower reaches of the Syr Darya River. Now, the Uzbek Hydromet reports that because of the upgrade to its central communications center, the accuracy of short-term meteorological and hydrological forecasts has improved by 12%, and long-term forecasts up to 20% over the last four years.

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